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## CHARLES DARWIN, THE MAN

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**A**T the present time, which marks the fortieth anniversary of the death of Charles Darwin (died April 19, 1882), an odd rerudescence of the old opposition to evolutionary thought in the less educated circles is challenging the attention of men of science in this country. But to us it seems much more appropriate to the anniversary to undertake to consider Darwin's personal traits, and especially such aspects of his character as bear upon his far-reaching influence upon men to-day.

Charles Robert Darwin was born in 1809 of a family in which a considerable variety of excellent mental attainments are to be found; a family in which, if we should try to note any single outstanding mental characteristic that found repeated expression, we should have to say that the most constant trait was a very highly developed curiosity. Robert Waring Darwin, his father, was a physician. He was neither scientific nor philosophical in the strict sense, as it is reported that he did not try to generalize his knowledge under general laws. Yet he formed a theory for almost everything which occurred. He is described as having an extraordinary memory for people, events and dates, as being an unusually shrewd judge of character, and also a cautious and good man of business. The grandfather, Erasmus Darwin, showed a speculative turn in his curiosity, and was the author of the afterwards famous *Zoonomia*. Among more distant relations and ancestors are men who gave their enthusiasm to such subjects as numismatics, statistics and various branches of natural history.

On the maternal side, Darwin had the possibility of inheriting the unusual ability in practical arts for which the Wedgewood family was noted. His mother died early, when the son was only eight years of age, and the published record of her tells little more than that she was of a most kindly and sympathetic nature.

Charles Darwin felt the very deepest of personal devotion to his father, and many of his own traits of character are a very natural development from the family atmosphere in which he was raised. This applies especially to his kindness and ready appreciation of others, and his extreme modesty as regards his own opinions and

accomplishments. As regards traits that were needed for his future career, it was his opinion that he acquired little besides the love of observing.

School seems to have been of exceptionally slight benefit to the young scientist. In fact the comments upon his education that he makes in his reminiscences are in surprisingly similar tenor to the ironic undercurrent in Henry Adams's reminiscences of his education. He was not taught to observe, nor to think, nor to use the languages which he would need, nor to make serious use of mathematics. To the end of his formal education, his desire seems to have been little more than to escape, usually into the country in company with congenial hunting companions and nature lovers. Strangely enough, this applies even to his life for two years as a medical student in Edinburgh, where he apparently came under a group of lecturers who were uncommonly devoid of inspiration, so that he felt positively repelled even from geology and botany. On the other hand, he began there to make acquaintances who developed his inclination toward acute observation of nature. He names in this connection the zoologist, Grant, and several other young university men, a negro taxidermist, and some of the fisher folk at Newhaven.

As the young Darwin showed only distaste for the medical sciences as presented to him, a church career was proposed instead, and he brushed up on his rusty Greek, to gain admittance to Cambridge. It is interesting that among his studies he found algebra and the classics unutterably dull, but geometry delightful for its vivid and precise logic, and Paley's "Evidences" and "Natural Theology" similarly pleasing for its keen deductive reasoning.

But in the main he shunned his studies in Cambridge as consistently as he had in Edinburgh. He became a devotee of hunting and riding, and then later became deeply engrossed with collecting beetles. "No poet," he says, "ever felt more delighted at seeing his first poem published than I did at seeing in Stephens's Illustrations of British Insects the magic words 'captured by C. Darwin, Esq.' "

Here again, as it had been in Edinburgh, the most important aspect of his life came from the friendships which he formed. Especially noteworthy were his constant companionship with Henslow, the professor of botany, and toward the end of his stay, his acquaintance with Professor Sedgwick of geology.

"Looking back," he says, "I infer that there must have been something in me a little superior to the common run of youths, otherwise the above-mentioned men, so much older than I and higher in academic position, would never have allowed me to asso-

ciate with them. Certainly I was not aware of any such superiority."

Darwin's keen love of good logic and his passion for observation seem not to have been united in the same object in any of his activities in Cambridge, and the thought that they might conceivably be so united seems first to have been brought to him by a conversation with the geologist Sedgwick in the summer of 1831 (*Life*, p. 48): He told Sedgwick of a certain tropical volute shell that was supposed to have been found in an old gravel pit near Shrewsbury, England. "He at once said that it must have been thrown away by some one into the pit; but then added, if really embedded there it would be the greatest misfortune to geology, as it would overthrow all that we know about the superficial deposits of the Midland Counties. . . . I was . . . utterly astonished at Sedgwick not being delighted at so wonderful a fact as a tropical shell being found near the surface in the middle of England. Nothing before had ever made me thoroughly realize, though I had read various scientific books, that science consists in grouping facts so that general laws or conclusions may be drawn from them."

Darwin's appointment to H. M. S. *Beagle*, in 1831, when he was 22 years of age, was the beginning of his serious education. (Huxley, p. 271): "While at sea, he diligently collected, studied, and made copious notes upon the surface fauna. But with no previous training in dissection, hardly any power of drawing, and next to no knowledge of comparative anatomy, his occupation with work of this kind—notwithstanding all his zeal and industry—resulted for the most part in a vast accumulation of useless manuscript." It was in geology that his training first began to show fruit. He had with him the first volume of Lyell's "Principles of Geology," and this book seems to have had a greater influence upon his scientific methods than any other one factor.

In this book Lyell expounds by the inductive method the "uniformitarian" conception of geological history, which, unlike the cataclysmic theory which was then generally accepted, viewed the course of this history as controlled by the prolonged action of the very same forces that we can study at work to-day. The influence of this volume upon him was profound and manifold; so great indeed, that later when he had convinced himself of the doctrine of natural selection, it became his conscious ambition to present his theory to the public in a book modelled along the same logical lines as Lyell's great work. Under the guidance of this book he became a keen and systematic geological explorer, and he was able at the end of his voyage to present the world with three important monographs in that science, covering the coral islands, the volcanic

islands and the South American continental regions which he visited. It is interesting that he recommends geology to his cousin, W. D. Fox, telling him that in it "there is so much larger a field for thought than in the other branches of natural history;" also "Geology is a capital science to begin, as it requires nothing but a little reading, thinking and hammering." Evidently the instinct for generalization had at last got control over him.

From this date on, investigative science becomes more and more frankly his predominant interest, so that a year later (1836) he confesses about certain ports which he expected to visit "these will be a poor field for natural history, and without it I have lately discovered that the pleasure of seeing new places is as nothing."

When he returned to England in 1836, at the age of 27, his characteristics as a scientific man were fully formed. Thereafter the chief scientific events of his life are summed up in the development and publication of the great generalizations for which he will ever be remembered. So we can stop tracing his biography, and concern ourselves with his outstanding traits.

One of the traits which shows most vividly to the reader of Darwin's letters, and of his "*Journal of the Voyage of the Beagle*," is his keen ability to place his finger precisely upon the unsolved mysteries of contemporary science, and his apparently instinctive sense as to which of these mysteries ought to be capable of solution. It is obvious what a depth of intuition he showed, when he started, in 1837, a notebook on the nature and mutability of species and varieties in nature and under domestication. The related mystery of geographical distribution is most vividly handled in the "*Voyage of the Beagle*." As early as 1835 the discussion of an epidemic among the Maories gave him the occasion for a similarly clear expression of the scientific mystery of contagion. Thus his mind was perpetually setting him problems of the most fundamental nature, which he simply could not leave alone. His son quotes the characteristic remark which a new experimental idea would often bring from him: "I can't rest now, till I have tried it."

The problems to which he gave his time were always ones which were capable of approach by the methods of a naturalist, and the naturalist's methods were always his preference. Almost always he collected great masses of facts, the qualitative range of which usually occupied his attention much more than their quantitative mathematical analysis. His method did, however, lead him to gather facts in such quantities that it was only possible to master and present them by using the simpler form of statistical treatment, and he may almost be said to have introduced this method as a mental tool for naturalists.

As to the solutions to his problems, he confesses that only in the rarest instances did he have an inkling of the right clue, until after extensive data had been collected. He mentions only one important exception to this rule, and that is one of his earliest contributions to science, the theory of the formation of coral reefs. In all other important cases he started either without any hypothesis at all, or else with a tentative hypothesis that had later to be discarded.

It is small wonder that the unwritten history of his discarded hypotheses left him increasingly mistrustful of all elaborately deductive reasoning. For all deduction is based on the preliminary acceptance of a group of laws or hypotheses. In this respect he seems to us of to-day to contrast sharply with many of the characteristics of his own age, which was certainly much given to far-flung systems of speculative reasoning.

It is possible that some one may feel like challenging this statement that Darwin's speculations were not built into far-flung and elaborate systems like those of his leading contemporaries. But I believe that his methods in seeking a scientific solution of the problem of species fully justify the assertion. When he became dissatisfied with the orthodox doctrine of special creation, he did not turn at once to one of the doctrines of descent, several of which had already been propounded. Instead he insisted upon waiting to detect some process by which species are actually undergoing transformation at the present day and then he merely pointed out that within the vast extent of geological time there was room for this process to achieve results of the most startling magnitude.

Only in the one instance of his "Provisional Hypothesis of Pangenesis" he appears superficially to deviate from his preference to keep away from elaborate systems of theory. But he was himself most keenly alive to a difference in status between this provisional, unproved hypothesis which he brings forward as probably a helpful stimulus to the investigation of heredity, and the other theses he has defended, such as natural and sexual selection, which are to him scientific principles, the actual proofs of which are already substantially in hand. Had he taken the latter attitude toward Pangenesis, he would have been committing the typical intellectual sin of his era, and perhaps of many another era, of building great speculative structures upon slight foundations.

In the second place, in spite of certain intricacies in the details of the hypothesis, the speculative foundation of Pangenesis is not really intricate. It rests simply on two suppositions: (1) that all heredity is by continuity of substance, and (2) the now discarded supposition that every part in a many-celled animal begets the corresponding part in the offspring. It follows from these

two suppositions, that the gonad or the germ plasm would not be the seat of heredity, but merely its vehicle, receiving the fundamental active material agencies of heredity (the "gemmules") from every cell of the parental body, and packing them into the germ cell. Beyond this, all that Darwin has to say about the hypothetical gemmules is that if such is the basis of heredity, then various ascertained facts regarding the course of heredity indicate that the said gemmules must be assembled, and must become active or latent according to a certain set of rules. And that, in brief, is the whole of the "provisional hypothesis of Pangenesis."

Another aspect of Darwin's scientific temperament is his absolute candor and open-mindedness. We may note a delicious instance of this, which struck his own sense of humor. In 1856 Lyell and a great many of the world's best field naturalists were accounting for the distribution of plants and animals to the oceanic islands by the theory of continental extensions to include these islands. Darwin saw strong reasons to disbelieve this, at least as applied to mid-oceanic islands, and so was in friendly controversy on the subject for some time. But if he should win this controversy, think what difficulties he was preparing for his soon-to-be-published doctrine that structural relationship meant blood relationship between the insular and continental floras! So he spent endless pains in incubating the mud from ducks' feet, to learn what seeds birds might carry on their feet, and proving such pertinent facts as that grass seed, eaten by minnows, which in turn were eaten by storks, would be avoided by the storks in a fertile condition. Referring to one of these prospective tests, he exclaims, "This is an experiment after my own heart, with the chances 1,000 to 1 against its success!" And commenting at another time upon his whole dilemma of distribution he says, "There never was such a predicament as mine: here you continental extensionists would remove enormous difficulties opposed to me, and yet I cannot honestly admit the doctrine, and must therefore say so," and then adds, "Nothing is so vexatious to me, as so constantly finding myself drawing different conclusions from better judges than myself, from the same facts."

In his self-analysis, which forms a part of his brief autobiography, he remarks that he believes himself freer than the average man from the danger of reasoning by catch-phrases. Very characteristically he suggests that his lack of facility in expression may have helped guard him against such a fault.

Another virtue which we may just mention in passing is that for Darwin every sound scientific explanation must pin solidly to earth. The mysticism of such a naturalist as Agassiz was utterly

foreign to him, so that he could only remark that it was strange so brilliant a man should express such opinions.

Many things connected with his methods of work throw an interesting light on his character. He declares himself that during his scientific career his industry has been nearly as great as it could have been in the observation and collection of facts. To compensate for the delays caused by ill health, he kept his work methodical to a very high degree. Because of the nature of his work, he gathered great quantities of material from other naturalists, observations which they had made with other considerations in mind. It is indicative of the scale on which he gathered data, that at the height of his work he had some 40 large portfolios of classified and indexed notes. His racks of notes may be seen in the picture of his study at Down (Life I, p. 101).

Whenever he broke loose from the routine of his schedule, he called it "idling;" for example, if the work in hand was geology, and he suspended it for a few days to carry out and experiment on one of his problems.

His instinct for an inherently sound and convincing presentation of the evidence seems to have endowed him with almost limitless patience. From the date when he first began organizing his thought on the problem of the Origin of Species, to the date of the first preliminary account of his conclusions, was a period of 21 years. When the book itself appeared, one year later still, its more than 400 close-printed pages were an abstract, at about one fourth size, of the intended work, which itself was but an abstract of his argument as he had massed it in his folios. This slowness came from thoroughness, scientific caution, and mistrust of his ability to persuade, probably far more than from the more superficial cause of ill health. Darwin speaks of the advantage that he often gained thereby, in being able to criticize old chapters objectively before ever submitting them to publication.

In his correspondence, and, it is stated, in his conversation, he showed much felicity of expression. But when he wrote in argument his style was undoubtedly liable to be clumsy.

"There seems," he says, "to be a sort of fatality in my mind, leading me to put at first my proposition in a wrong or awkward form." He conquered this difficulty to some degree by "scribbling in a vile hand whole pages as quickly as possible" and revising only at a later date.

Among his personal characteristics kindness, modesty and frank appreciation of others are most conspicuous. His modesty has often been remarked upon, but to really appreciate how deliciously far it goes, one has to read his letters at first hand.

His freedom from the trammels of tradition and his keen sympathy for every form of misfortune probably account for his description of himself as a radically inclined liberal. His anti-slavery sentiments at all times, and particularly during the American Civil War, were very intense. A most odd expression of his humanitarian interest was his attitude toward Christian missions. He was most appreciative of the wonders that had been accomplished in Polynesia, but could not believe that peoples so low in the scale as the Fuegians and the Australian Blacks could possibly receive any benefit from mission work. He expressed this opinion freely, and when finally the reverse was proved in the case of the mission to Tierra del Fuego, he enthusiastically acknowledged his mistake, and expressed it in the form of a regular annual remittance of £5 to the cause of the mission.

He had a habit of writing his appreciations to the authors of books he had enjoyed, which we can understand if we consider how greatly he himself appreciated such letters written to him. He was also a man who very quickly treated men of a younger generation as his equals, or even his superiors in science, so that he was often a great inspiration to younger men.

In esthetics Darwin had a tremendous, and it might be said, a highly trained feeling for the beauties of nature. His deepest responses were to those scenes that expressed to his knowing eye some aspect of the wonderful cosmic drama.

The wastes of Patagonia and the sight of a naked savage in his native environment are two scenes which he speaks of as most strangely impressive, evidently through the story they tell him of *das ewige Werden*. He never forgot the sublimity of the Cordillera or the lavish luxuriance of the Brazilian forests. And we have his children's word to testify to the peculiar keenness of his appreciation of the precious, homely loveliness of his own England, which seemed hardly diminished, as nearly as any of them could tell, to the very end of his life.

In music, painting and literature, he had an essentially naïve and untrained, but for the most part fairly lively enjoyment. In his later years he lost his taste for the set, formal types of literature, so that verse, or the standard drama (like Shakespeare) no longer interested him. This seems to be the principal excuse, along with the quieter enthusiasms of old age, for his self-criticism as having atrophied on his esthetic side. Yet his family reports that even totally ignorant as he was of the slightest vestige of the principles of music, he always loved to listen, and his choice was uniformly for a good quality of music. So before taking too seriously his account of his esthetic atrophy, we really ought to view him a

little through the eyes of his children and friends, and then decide how much to discount his statements on the score of his peculiar modesty.

We are especially interested to-day in the contribution of Darwin to the spirit of science, and for that reason should like to consider his spirit as it were apart from the actual intellectual content of his additions to human knowledge. That is the more possible, as we can easily imagine that even without his aid the evolutionary hypothesis might have triumphed within a few decades of when it did actually triumph. The world had become accustomed to the idea of nature acting in strict accordance with law; to the concepts of stellar evolution, and of an inconceivably prolonged geological and paleontological history. It had even been recognized that such laws as the conservation of energy and the conservation of matter were valid in the kingdom of life. Goethe, Erasmus Darwin and Lamarck had long previously directed attention to the conception of an orderly derivation of the more complex types of life out of their less complex predecessors.

To be sure, no definite evolutionary theory had as yet won any great following among naturalists, because all of them up to that time had been either too vague or else too mystical to carry conviction. Lamarck's theory, which was most prominent because it had been the most fully elaborated, had a very strong mystical element. It was, broadly, to the effect that the offspring derived their physical constitutions not merely from the physical constitutions with which their parents had started life, but also from the additional development which the parents acquired through exercise and habit, and from a vast accumulation of "prenatal influences," if I may so express it, derived from the emotional life, and more especially from the desires, strivings and aspirations of the parents during their whole life previous to the act of generation.

Other defenders of evolution through descent usually either appealed to the same group of supposed influences, or emphasized one or another factor within this group (habit and exercise, for example), or appealed to an innate or divinely instilled tendency toward structural elaboration and self-perfection.

Immediately previous to Darwin's first public announcement of his natural selection theory, things were happening that indicated the readiness of a group of younger scientists to turn attention once more to an evolutionary conception. Herbert Spencer had already indicated his adherence to a modified form of the Lamarckian theory. Huxley, who had spurned the prenatal influences of Lamarck, was in private expressing at least an equal

degree of dissatisfaction with the orthodox theory of species as independently created entities. Von Baer, in Germany, was definitely of the opinion that some form of evolution through descent would have to be accepted. Finally came Wallace's paper, independently propounding the theory of natural selection, which as is so well known was read at a meeting of the Linnean Society jointly with a brief preliminary paper by Darwin, in the summer of 1858.

Suppose now that the great series of publications by Darwin had not come from his hands, in what ways would the world of science be poorer to-day? We can easily imagine that Wallace might have won Huxley, and have found Spencer a powerful ally. Huxley was not the type of man who could have rested till he had converted other scientists, and we can hardly doubt that this gifted debater, possibly aided by others of the young biological group, might gradually have compelled the scientific world to pay attention to the evolutionary hypothesis.

Without going into detail, the same situation held true of Germany, von Baer in particular being more than ready for any rational doctrine of descent.

If through these channels a great success had by any chance been achieved, the immediately following history would have been but little different from what it actually was. For in a sense Darwin was hardly at all an active participant in the dramatic contest that waged about his book. The giants of this battle were masters of debate, of repartee, of innuendo, such as Huxley and Wilberforce, and not at all the quiet, uncontentious, semi-invalid naturalist, who in his family circle applauded alike the brilliant thrusts and neat maneuvers of both groups of contestants. Darwin's supreme ambition had nothing whatever to do with the dust that was stirred up by his book; for it was simply to be able to thoroughly convert Huxley, the zoologist, Hooker, the botanist, and Lyell, the geologist. If many other scientists were also converted, that would seem to him a surfeit of success; and as for that group which obviously could never accept his argument, he was simply astonished that they took notice and reacted so quickly and so vigorously.

The fact, then, that the "Origin of Species" became at once the bone of contention between the great schools of thought did not give its writer any great immediate power to influence the spirit of the mid-nineteenth century, which became, in spite of him, and even by reason of his contribution, more and more exuberantly speculative. The mass of his contemporaries were akin less to him than to the temperament of Herbert Spencer, of

Haeckel, and of Weismann, with their elaborate theoretical systems.

During these exciting times, the man who had started it all was quietly at work upon a book descriptive of "The various contrivances by which orchids are fertilized by insects." Incidental bits of this study came out in 1860, 1861, and 1862, and the finished work in 1862. Such was Darwin's continual attitude toward controversy—not contemptuous but simply unworried, content to make use of whatever criticism was helpful, and to watch to improve the wording in the next edition wherever it appeared that his language was honestly misunderstood.

Only a very few of the adverse criticisms touched him where it hurt. One, for example, let it be understood that he wrote with an air of cock-sureness, a sin of which he could not bear even the shadow of suspicion. At another time Darwin bursts into righteous indignation on Huxley's behalf, when he catches a reviewer ascribing to Huxley a motive in his belief—Lyell's "'object' to make man old, and Huxley's 'object' to degrade him. The wretched writer has not a glimpse of what the discovery of scientific truth means." Such was his spontaneous outburst at the least hint that scientific opinions might be motivated.

Darwinism was the signal for an overwhelming readjustment of popular metaphysics, as everybody knows, but it really seems hard to realize to-day how deeply men's minds were shaken, all through the thirty or forty years of the readjustment, by questions of purely abstract philosophy, or to what an extent the biological scientists have taken part in the philosophic questions. To make vivid the acuteness of that old situation, we may recall how Huxley, intensely loyal as he always was to the scientific concept of causation, nevertheless declared in substance (Romanes Lecture) that ethics was inexplicable, to the best of his understanding, from the standpoint of biological evolution; or again to the attitude of Wallace (Darwinism, Ch. XV) that the higher intellectual, esthetic and moral gifts of man are gratuities bestowed upon him by a benevolent deity through agencies entirely outside of the workings of biological evolution.

In all these abstruser corollaries of evolution Darwin took absolutely no part whatever, and even when questioned he did little more than plead ignorance and incompetence. Theism seemed to him a deduction flung too far afield to be dependable. He can not help doubting whether our brain equipment was ever designed for such uses. Nevertheless, he seems to have retained to the end of his days the simple rudiment of faith that "this universe is not the result of blind chance" ("Descent of Man," last pages;

"Life" I, 286), even though our intellects may not have the caliber to prove what else it is.

In all this, and especially in his freedom from intensity over such matters, he was hardly a type of his own era, and I can not help feeling that he is more at one with the complexion of thinking men of to-day—men to whom the evolutionary conception is as natural as it was to Darwin himself, so that they are no longer fussed by its possible metaphysical implications. Like him they still possess a philosophy of life, but one that is more proximate and less abstruse than what their nineteenth century predecessors were mostly wrestling with.

Is it not possible that the older generation of teachers to-day, the men who were brought up on Darwin as their daily bread, but who on account of the mental stresses of their era had to fight to attain and to defend the true Darwinian spirit of scientific candor—that these teachers to-day are finding in their pupils youths for whom a part of this victory has been won in advance, so that scientific candor, the spirit of unmotivated judgments, is for them an easier lesson than it was during the era of storm and stress in which the teachers had to learn it?

If this description is accurate, a substantial part of the credit must be ascribed to the slow-working leaven of the personality of Darwin himself, perpetuated in his writings and ramifying through the examples of those whose scientific ideals he has inspired.